REMARKS

The indication that the subject matter of claims 5 to 11 and 17 to 23 are drawn to the allowable subject matter is noted with appreciation.

Applicant thanks the Examiner for acknowledgment of a claim for foreign priority under 35 U.S.C. §119 and indication that the certified copies of the priority documents have been received by the Office.

Figure 7 was objected for lacking a legend "Prior Art". Responding to this objection a legend "Prior Art" has been added on Figure 7. Additionally, the minor spelling errors on Figure 5 have been corrected by this amendment. The clean copies of corrected Figures 5 and 7 are included with this paper. The Examiner is respectfully requested to replace the originally filed Figures 5 and 7 with concurrently submitted corrected ones.

Claims 1 to 28 are currently active in the application. By this amendment all claims have been amended to improve claim language responding to the Examiner's objections and rejections and in order to clarify the claimed subject matter. The support for this amendment can be found at least on Figures 1 to 4 and page, 13 and 37, lines 20 *et seq.* of the specification. No new matter has been introduced by this amendment.

Claims 1 to 28 haven objected for using verbs "characterized" and "characterized by comprising". Responding to this objections claims 2 to 12, 16-17, and 24-26 have been amended to eliminate the expression "characterized by" and replaced it with suitable expressions.

Additionally, objected dependent claims 2 to 12 and 14 to 24 for using an indefinite article, have been amended to incorporate a definite article, so claims 2 to 12 now starts with "The multi-beam antenna transmitter/receiver..." and claims 14 to 24 starts with "The transmission beam selection method...". The Examiner is respectfully requested to withdraw this rejection in view of the above amendment.

Claims 1 to 28 have been rejected under 35 U.S.C. 112, second paragraph,

as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner objects the term "user", calling this "limitation" indefinite and stating that it is not clearly presented/explained in the specification. The Applicant respectfully points out that the term "user signal" is clearly explained on page 3, lines 19 *et seq*. of the specification. Particularly, the specification states the following, "...signals received by the N reception antenna elements 202_1 to 202_N contain desired user signal components, interference signal components, and thermal noise." Applicant believes that it is clear for a person skilled in art that "user signals" of the present disclosure are the signals which carry useful for a user information without addition of noises and interference. For instance, the primary reference to Matsuoka et al. calls the same signals as "desired waves". Applicant believes that there is no obscurity in claim or specification language in this regard. The Examiner is respectfully requested to withdraw this rejection in view of the above argument.

The present invention aims to overcome an inability of conventional multi-beam antenna transmitter/receivers to select an actually optimum transmission beam. The main idea of the present invention well presented in the example described on page 13 of the specification. As it can be seen, if a beam (in the example it is beam 2) has several components, the overall quality reception of that beam is calculated as a sum of the reception qualities numbers of all components, making this beam the highest in quality. In order to do so, the Applicant adds to the conventional multi-beam antenna transmitter/receiver a reception beam calculation unit shown in Figure 1 as block 108. According to the present invention, after antennas receive input signals, reception beams are formed in reception beam formation unit 104. The formed reception beams follow to a user demodulation block wherein overall reception quality of a user signal for each reception beam is calculated corresponding to a path delay/reception beam

number provided by reception beam path detection unit 106. After that transmission beam is selected on the basis of overall reception qualities calculated from reception qualities of path delays of user signals presented in the reception beams as determined by the reception beam calculation unit 108.

The patent publication to Matsuoka et al. discloses a radio communication apparatus with an adaptive antenna wherein an arrival angle range of received signals effects signal transmission and allows to enhance an average reception SIR (Sustained Information Rate) at an opposing-side station. Matsuoka et al. apparatus is designed for a system using different frequencies for uplink and downlink and can easily estimate a DOA (Direction of Arrival) of radio waves. Specifically, a radio communication apparatus of Matsuoka et al. has a group of directional antennas and delay profile estimation section which estimates a delay profile representing arrival times of a desired wave and delay waves together with arrival angle. The transmission section selects an antenna which is going to be used for transmission on the basis of the arrival angle range estimated by arrival angle range estimation section.

The Examiner states that Claims 1-4, 12-16 and 24-28 of the present invention read over the publication to Matsuoka et al. Responding to this rejection, claims 1-4, 12-16 and 24-28 have been amended to present in better form and incorporate the main features of the present invention like calculation unit which is different from the publication to Matsuoka et al.

To emphasize the distinction, claims 1 to 28 have been amended to incorporate the essential features of the Applicant's device and method. Specifically, claim 1 as amended now recites,

> "A multi-beam antenna transmitter/receiver characterized by having a plurality of reception beams and a plurality of transmission beams <u>comprising:</u>
>
> <u>user demodulation means for receiving an output from</u>

reception beam formation means, said user demodulation means including:

reception beam path detection means for detecting a path delay for each user from an output from reception beam formation means and outputting the path delay/reception beam number;

reception beam calculation means for calculating an overall reception quality of a user signal for each reception beam from the reception quality of the user signal corresponding to a path delay/reception beam number as an output from the reception beam path detection means; and

transmission beam selection means for selecting the transmission beam on the basis of overall reception qualities calculated from reception qualities of path delays of user signals present in the plurality of reception beams as determined by the reception beam calculation means." (Emphasis added).

Analogically method claim 13 has been amended. As amended, it is submitted that independent claims 1, 13 and 24 to 28 clearly defines over the publication to Matsuoka et al.

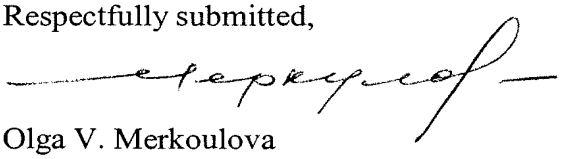
In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 1 to 28 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any

overpayment of fees to Attorney's Deposit Account No. 50-2041 (Whitham, Curtis, Christofferson & Cook P.C.).

Respectfully submitted,



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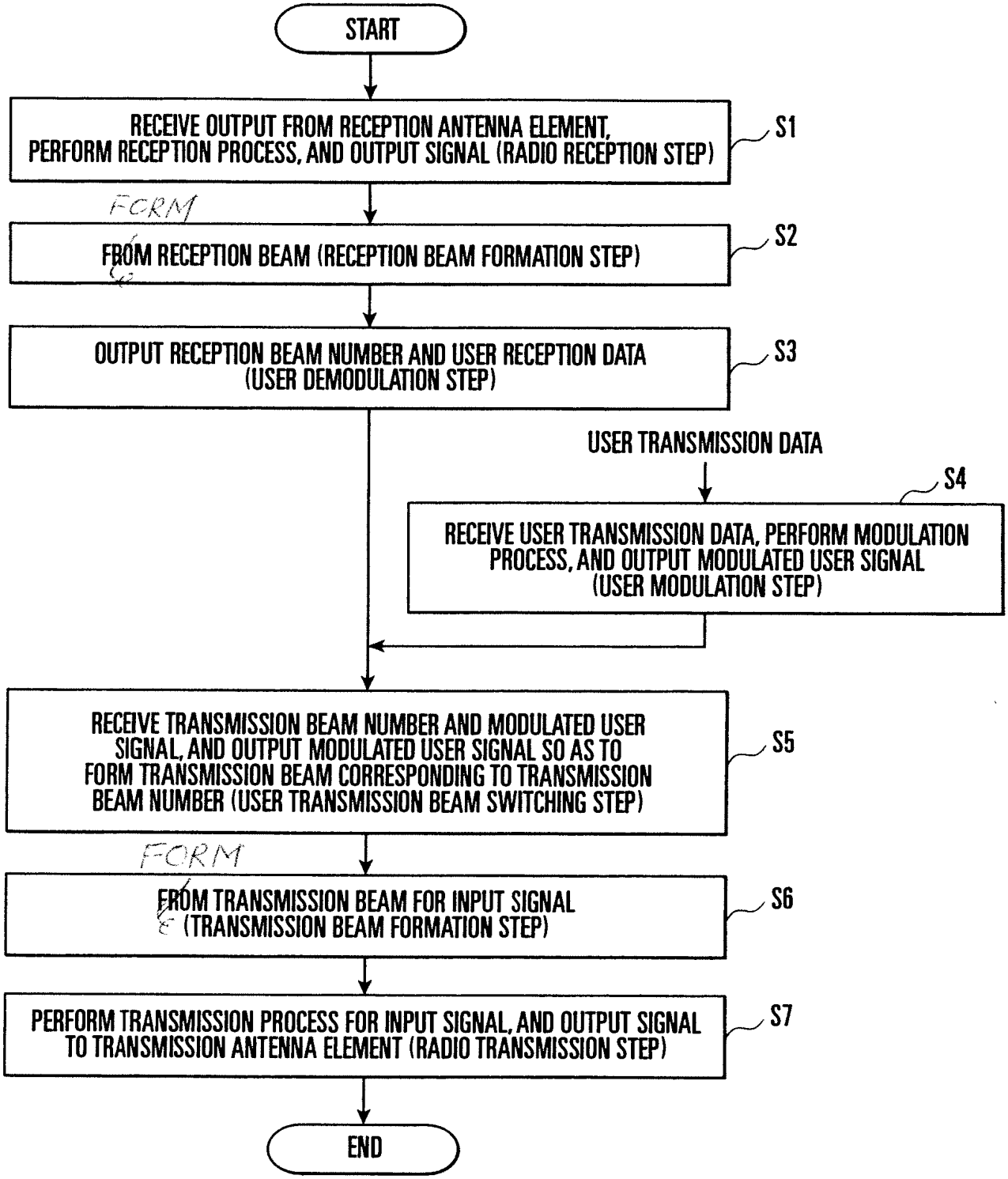
START
RECEIVE OUTPUT FROM RECEPTION ANTENNA ELEMENT, PERFORM RECEPTION PROCESS, AND OUTPUT SIGNAL (RADIO RECEPTION STEP)
S1
FORM
FROM RECEPTION BEAM (RECEPTION BEAM FORMATION STEP)
S2
OUTPUT RECEPTION BEAM NUMBER AND USER RECEPTION DATA (USER DEMODULATION STEP)
S3
USER TRANSMISSION DATA
S4
RECEIVE USER TRANSMISSION DATA, PERFORM MODULATION PROCESS, AND OUTPUT MODULATED USER SIGNAL (USER MODULATION STEP)
RECEIVE TRANSMISSION BEAM NUMBER AND MODULATED USER SIGNAL, AND OUTPUT MODULATED USER SIGNAL SO AS TO FORM TRANSMISSION BEAM CORRESPONDING TO TRANSMISSION BEAM NUMBER (USER TRANSMISSION BEAM SWITCHING STEP)
S5
FORM
FROM TRANSMISSION BEAM FOR INPUT SIGNAL (TRANSMISSION BEAM FORMATION STEP)
S6
PERFORM TRANSMISSION PROCESS FOR INPUT SIGNAL, AND OUTPUT SIGNAL TO TRANSMISSION ANTENNA ELEMENT (RADIO TRANSMISSION STEP)
S7
END

FIG. 5

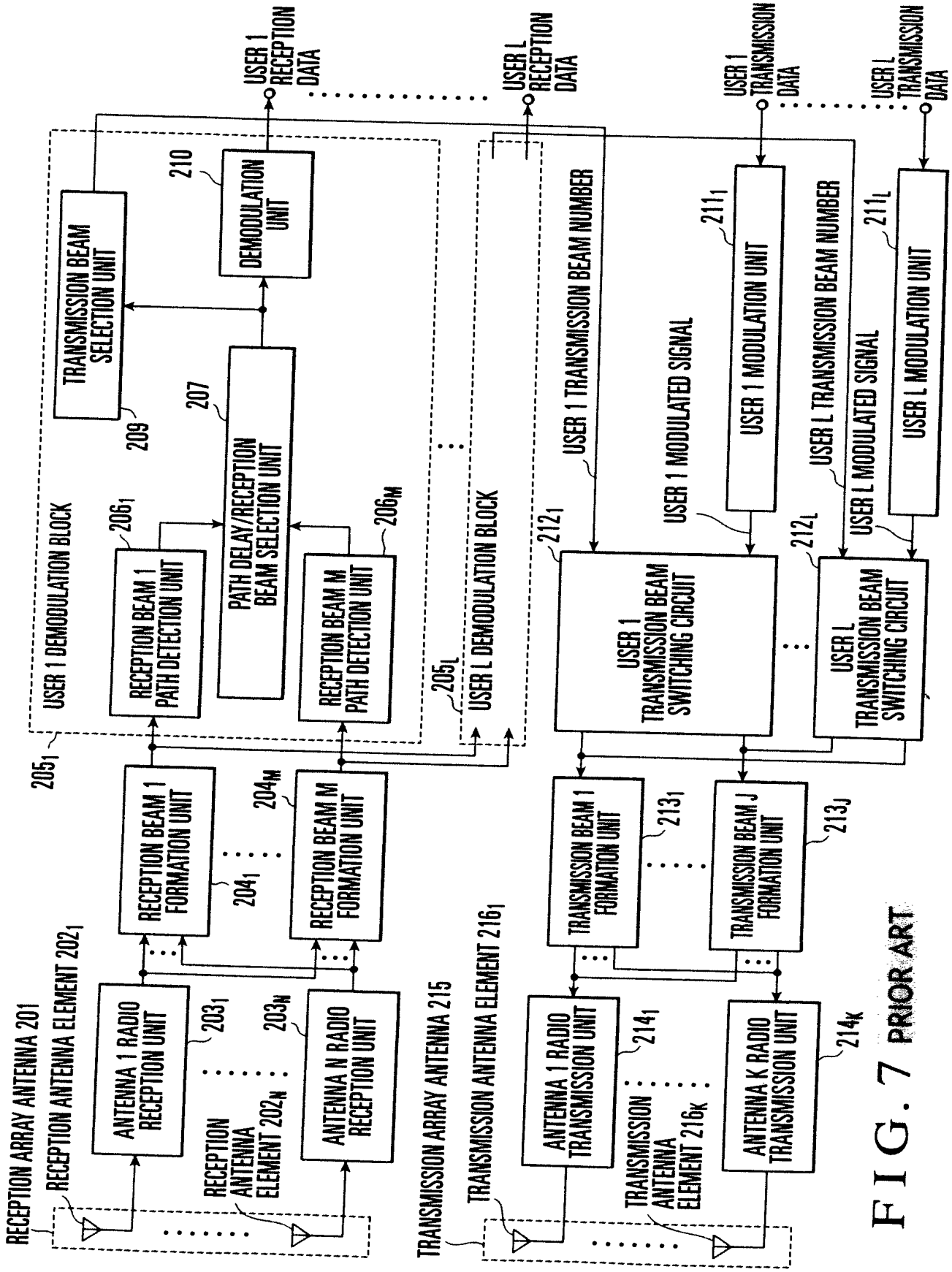

FIG. 7 PRIOR ART